



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 12, 2024 – 08:17 PM EDT

PDB ID : 3FWO  
Title : The large ribosomal subunit from *Deinococcus radiodurans* complexed with Methymycin  
Authors : Auerbach, T.; Mermershtain, I.; Bashan, A.; Davidovich, C.; Rozenberg, H.; Sherman, D.H.; Yonath, A.  
Deposited on : 2009-01-19  
Resolution : 3.71 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 1.20.1  
EDS : 2.36.2  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.2

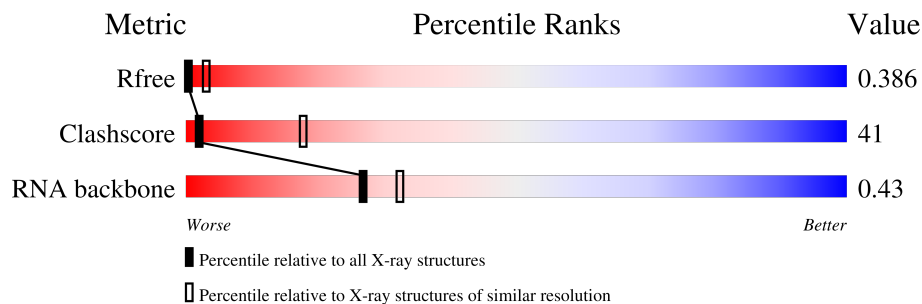
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.71 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1089 (3.90-3.54)
Clashscore	141614	1012 (3.88-3.56)
RNA backbone	3102	1027 (4.40-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	2880	
2	B	118	

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 61885 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

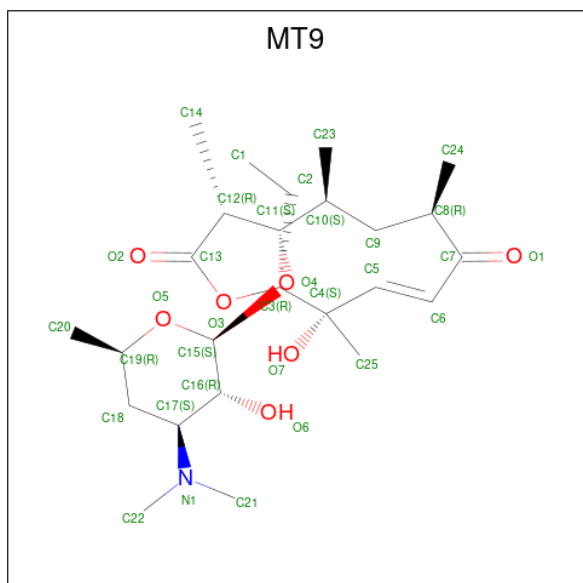
- Molecule 1 is a RNA chain called 23S RIBOSOMAL RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	A	2765	Total 59336	C 26469	N 10944	O 19159	P 2764	0	0	0

- Molecule 2 is a RNA chain called 5S RIBOSOMAL RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	B	118	Total 2516	C 1124	N 464	O 811	P 117	0	0	0

- Molecule 3 is (3R,4S,5S,7R,9E,11S,12R)-12-ethyl-11-hydroxy-3,5,7,11-tetramethyl-2,8-dioxocyclododec-9-en-4-yl 3,4,6-trideoxy-3-(dimethylamino)-beta-D-xylo-hexopyranoside (three-letter code: MT9) (formula: C<sub>25</sub>H<sub>43</sub>NO<sub>7</sub>).

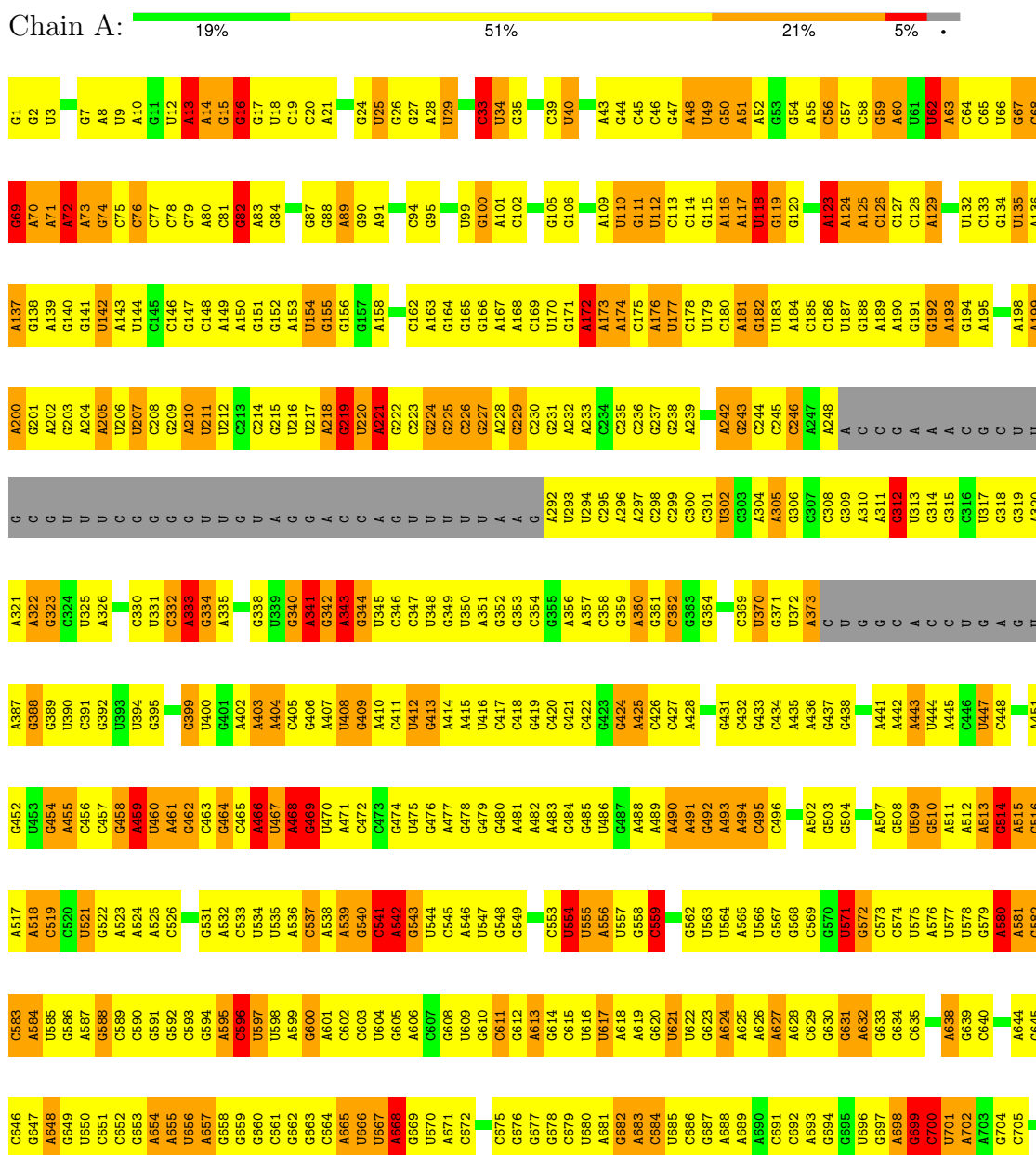


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	Total 33	C 25	N 1	O 7	0	0

### 3 Residue-property plots [i](#)

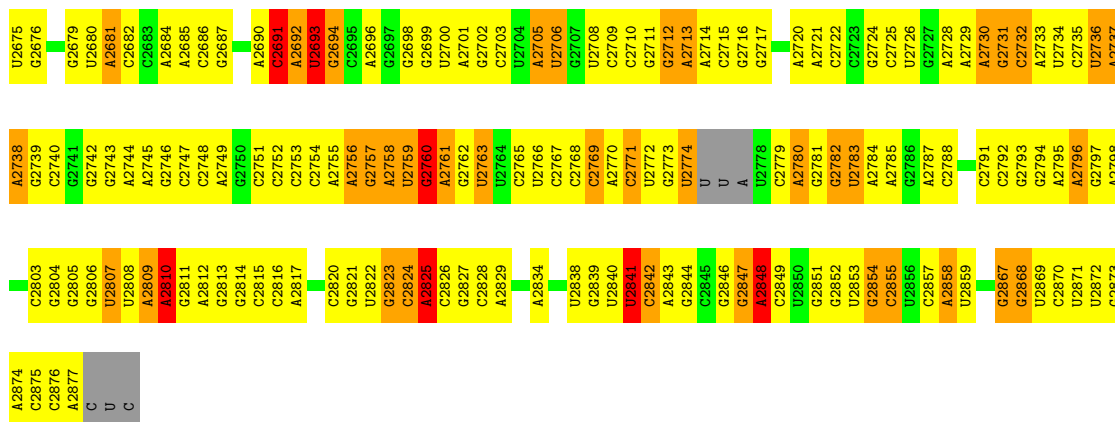
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: 23S RIBOSOMAL RNA

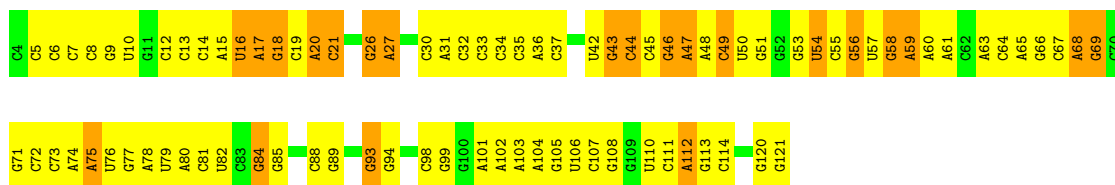




G3606	A1750	A1813	G1886	C1950	G2018	C2082	A	G2207	G2269	U2335	G2407	G2469	U2533	G3606
C2607	A1751	G1814	G1889	G1951	C2019	G2085	A	U2208	U2270	U2336	G2408	U2470	U2534	C2607
A2608	A1752	G1815	G1890	A1952	C2020	U2086	C	G2209	C2271	A2337	G2409	U2471	G2535	A2608
G2609	A1753	G1816	G1899	A1953	G2021	U2087	G	C2210	C2272	A2344	U2410	U2472	G2536	G2609
G2610	G1754	G1817	G1895	A1954	C2022	U2088	U	U2211	C2273	G2343	A2413	G2473	G2539	G2610
A2611	G1755	G1818	A1895	G1955	C2023	U2088	G	U2212	U2274	G2344	A2414	C2474	A2540	A2611
G2612	G1756	G1819	A1896	G1956	U2024	C2089	G	G2213	C2275	A2345	G2415	C2475	A2541	G2612
A2613	C1757	G1820	G1897	A1957	A2025	U2090	A	G2214	A2277	G2350	G2416	A2476	U2542	A2613
G2614	G1760	C1822	G1898	A1961	C2026	C2091	A	G2215	A2278	G2351	G2417	G2477	G2543	G2614
A2615	G1761	G1823	A1899	U2092	G2029	U2092	U	G2216	G2282	A2356	U2418	C2478	A2544	A2615
U2616	G1762	G1824	U1900	G1962	U2030	C2094	A	G2217	U2283	A2357	U2419	U2479	A2545	U2616
G2617	G1763	C1825	A1901	G1963	A2031	G2095	A	G2218	U2284	G2358	C2420	C2480	A2546	G2617
A2618	G1764	G1826	A1902	G1964	G2032	U2096	C2157	U2222	U2285	A2355	G2421	A2481	G2547	A2618
G2619	G1765	G1827	G1904	U1965	C2033	A2097	G	U2223	G2286	A2356	G2422	U2483	G2548	G2619
U2620	U1766	G1830	G1905	C1966	A2034	G	A2159	U2224	U2287	A2356	G2423	U2484	G2549	U2620
G2621	U1767	G1831	U1906	C1973	G2035	G2235	A	U2225	G2288	A2357	G2424	U2485	G2550	G2621
A2622	U1768	G1831	C1907	U1974	G2036	G2236	A	G2226	U2289	G2358	G2425	U2486	A2551	A2622
G2623	U1769	G1831	U1908	G1975	A2037	G2237	U	A2227	A2290	C2360	G2426	G2488	G2552	G2623
A2624	U1770	G1834	U1909	U1976	C2038	G2238	A	U2228	U2291	G2361	A2427	C2489	G2553	U2624
U2625	A1771	G1835	A1910	C1977	C2039	G2239	G	U2229	C2292	G2362	U2428	U2490	G2554	U2625
G2627	C1772	G1838	A1911	U1978	A2040	G2240	A	G2230	G2293	G2363	A2429	C2491	G2555	G2627
A2633	C1773	U1838	A1912	U1979	A2041	G2241	C	G2231	U2294	C2364	A2430	G2492	A2556	A2633
G2634	A1774	U1839	G1913	C1979	A2042	G2242	U	G2232	U2295	G2365	C2431	U2493	G2557	G2634
U2635	U1775	U1840	G1914	U1980	A2043	G2243	U	G2233	U2296	G2366	A2432	U2494	G2558	U2635
A2636	A1776	G1841	A1915	C1982	G2044	G2244	G	U2234	G2297	A2367	G2433	C2495	G2559	A2636
G2637	U1777	U1845	G1916	G1983	A2045	G2245	A	U2235	U2298	G2368	G2434	A2497	G2560	G2637
U2638	U1778	A1846	C1917	U1984	C2046	G2246	C	U2236	U2299	G2369	U2435	U2498	G2561	U2638
A2639	C1779	U1847	A1918	G1992	G2052	G2247	U	U2237	A2300	G2370	U2436	C2499	G2562	A2639
G2640	U1780	A1848	G1919	G1993	C2047	G2248	U	G2238	G2301	A2371	U2437	C2500	G2563	G2640
A2641	A1781	U1848	A1920	U1994	G2049	G2249	U	G2239	A2302	A2371	U2438	U2501	U2564	A2641
U2642	C1782	U1852	A1921	G1995	G2050	G2250	C	C2240	G2303	G2376	U2439	G2502	G2565	U2642
G2643	G1783	C1853	U1922	U1996	U2051	G2251	G	U2241	U2177	G2304	G2440	G2503	A2566	G2643
A2644	A1784	G1853	A1923	A1997	G2052	G2252	U	C2242	U2178	C2305	U2441	G2504	G2567	A2644
G2645	C1785	U1856	C1924	G1998	G2053	G2253	U	G2243	U2179	C2306	U2442	G2505	G2568	G2645
U2646	U1787	G1857	C1925	U1999	A2054	G2254	U	C2244	U2180	A2307	C2443	U2507	A2569	U2646
G2662	C1788	U1857	U1926	G1995	G2055	G2255	U	A2245	A2181	A2308	C2444	G2508	G2570	G2662
A2653	U1789	A1860	U1927	G1995	G2056	G2256	U	A2246	C2184	G2308	C2445	A2509	G2571	A2653
G2656	C1790	G1861	G1928	A1996	U2057	G2257	U	A2247	U2185	G2309	G2446	A2510	U2572	G2656
A2657	C1791	C1862	U1929	A1997	U2058	G2258	U	C2248	G2186	G2310	G2447	A2511	A2577	A2657
G2658	C1792	G1862	A1934	G1998	A2063	G2259	U	U2249	G2187	G2311	A2448	A2512	G2581	G2658
C2659	A1793	G1865	U1935	U1999	U2064	G2260	U	A2250	G2188	A2315	U2451	G2513	A2581	C2659
G2660	A1794	G1866	A1935	G2001	A2065	G2261	U	A2251	A2189	A2316	U2452	G2514	A2581	G2660
A2661	G1798	A1867	A1936	A2002	G2066	G2262	U	A2252	A2190	A2317	C2453	G2515	A2582	A2661
G2662	C1801	A1868	A1936	A2003	U2067	G2263	U	G2253	A2191	G2317	G2454	G2516	U2584	G2662
U2663	A1800	A1869	U2004	U2003	C2068	G2264	U	G2254	U2192	G2318	A2455	C2517	G2584	U2663
G2664	G1737	G1870	G1937	U2005	U2069	G2265	G	A2255	C2193	G2319	U2456	C2518	G2585	G2664
U2665	U1738	A1871	U1938	G2006	G2070	G2266	U	A2256	G2194	G2320	U2457	C2519	G2586	U2665
G2666	G1739	A1872	U1939	G2007	G2071	G2267	G	G2257	U2195	U2322	U2458	C2520	G2587	G2666
U2667	G1740	A1873	U1940	C2008	G2072	G2268	U	G2258	U2196	U2323	U2459	G2521	U2588	U2667
G2668	U1804	G1874	G1941	U2009	C2073	G2269	U	G2259	U2197	G2324	G2460	G2522	U2589	G2668
A2669	G1805	G1879	G1942	G2010	U2074	G2270	U	G2260	U2198	G2325	G2461	G2523	U2590	A2669
G2671	A1807	G1880	A1943	U2011	U2075	G2271	G	C2261	C2199	G2326	U2462	G2524	U2591	G2671
U2672	G1808	U1881	C1944	A2012	G2076	G2272	A	C2262	G2200	G2327	G2463	G2525	U2592	U2672
G2673	G1809	G1882	G1945	A2013	G2077	G2273	G	C2263	G2201	G2328	G2464	G2526	U2593	G2673
U2674	U1810	G1883	U1946	A2014	G2078	G2274	A	G2264	G2202	G2329	G2465	G2527	U2594	U2674
C2674	U1811	A1884	G1947	G2015	U2079	G2275	G	G2265	G2203	G2330	G2466	G2528	G2595	C2674
	U1812	C1885	A1949	G2016	U2080	G2276	C	G2266	A2204	G2331	G2467	G2529	G2596	
				U2017	U2081	G2277		G2267	A2205	G2332	G2468	G2530	G2597	



• Molecule 2: 5S RIBOSOMAL RNA



## 4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	172.50Å 415.69Å 701.73Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 3.71 38.32 – 3.71	Depositor EDS
% Data completeness (in resolution range)	94.7 (30.00-3.71) 94.7 (38.32-3.71)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.17	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.89 (at 3.66Å)	Xtrriage
Refinement program	CNS 1.2	Depositor
R, $R_{free}$	0.278 , 0.337 0.363 , 0.386	Depositor DCC
$R_{free}$ test set	12496 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	128.9	Xtrriage
Anisotropy	0.649	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.17 , 49.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.83	EDS
Total number of atoms	61885	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	138.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.05% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.



## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MT9

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z  > 5$	RMSZ	# $ Z  > 5$
1	A	0.62	4/66440 (0.0%)	0.85	132/103628 (0.1%)
2	B	0.48	0/2813	0.78	0/4384
All	All	0.61	4/69253 (0.0%)	0.85	132/108012 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	167

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	700	C	N1-C2	8.55	1.48	1.40
1	A	542	A	C5-C6	-5.95	1.35	1.41
1	A	824	U	N1-C2	5.53	1.43	1.38
1	A	1313	U	C2-N3	5.37	1.41	1.37

The worst 5 of 132 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	A	985	G	N9-C1'-C2'	12.79	130.63	114.00
1	A	514	G	N9-C1'-C2'	11.06	128.38	114.00
1	A	1279	G	N9-C1'-C2'	10.86	128.12	114.00
1	A	13	A	N9-C1'-C2'	10.38	127.49	114.00
1	A	2405	A	N9-C1'-C2'	9.29	126.08	114.00

There are no chirality outliers.

5 of 167 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	16	G	Sidechain
1	A	25	U	Sidechain
1	A	29	U	Sidechain
1	A	33	C	Sidechain
1	A	40	U	Sidechain

## 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	59336	0	29907	3646	0
2	B	2516	0	1286	133	0
3	A	33	0	43	5	0
All	All	61885	0	31236	3782	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 41.

The worst 5 of 3782 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:987:G:H5'	1:A:1167:A:N6	1.56	1.19
1:A:1714:A:H5'	1:A:1715:A:H5''	1.21	1.17
1:A:2172:U:H2'	1:A:2173:G:H5''	1.25	1.16
1:A:1153:A:O2'	1:A:1154:A:H3'	1.44	1.16
1:A:623:G:H4'	1:A:626:A:H62	1.10	1.15

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

There are no protein molecules in this entry.

### 5.3.2 Protein sidechains [i](#)

There are no protein molecules in this entry.

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	2757/2880 (95%)	676 (24%)	191 (6%)
2	B	117/118 (99%)	17 (14%)	5 (4%)
All	All	2874/2998 (95%)	693 (24%)	196 (6%)

5 of 693 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	13	A
1	A	14	A
1	A	15	G
1	A	33	C
1	A	34	U

5 of 196 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	1710	U
1	A	2045	A
1	A	1749	G
1	A	1923	U
1	A	2237	C

### 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

1 ligand is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	MT9	A	2881	-	33,34,34	2.15	10 (30%)	44,50,50	1.87	9 (20%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	MT9	A	2881	-	-	11/46/62/62	0/1/2/2

The worst 5 of 10 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	2881	MT9	C10-C11	6.74	1.65	1.53
3	A	2881	MT9	C4-C5	4.75	1.56	1.51
3	A	2881	MT9	C9-C10	4.20	1.60	1.54
3	A	2881	MT9	C8-C7	3.79	1.57	1.51
3	A	2881	MT9	O3-C13	2.96	1.41	1.34

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	2881	MT9	C3-O3-C13	-5.01	109.45	118.20
3	A	2881	MT9	O4-C15-O5	-5.00	97.53	110.69
3	A	2881	MT9	C8-C9-C10	4.84	123.77	115.09
3	A	2881	MT9	O4-C11-C12	-3.66	104.99	111.16
3	A	2881	MT9	C9-C8-C7	2.73	117.14	110.64

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	2881	MT9	C11-C12-C13-O3

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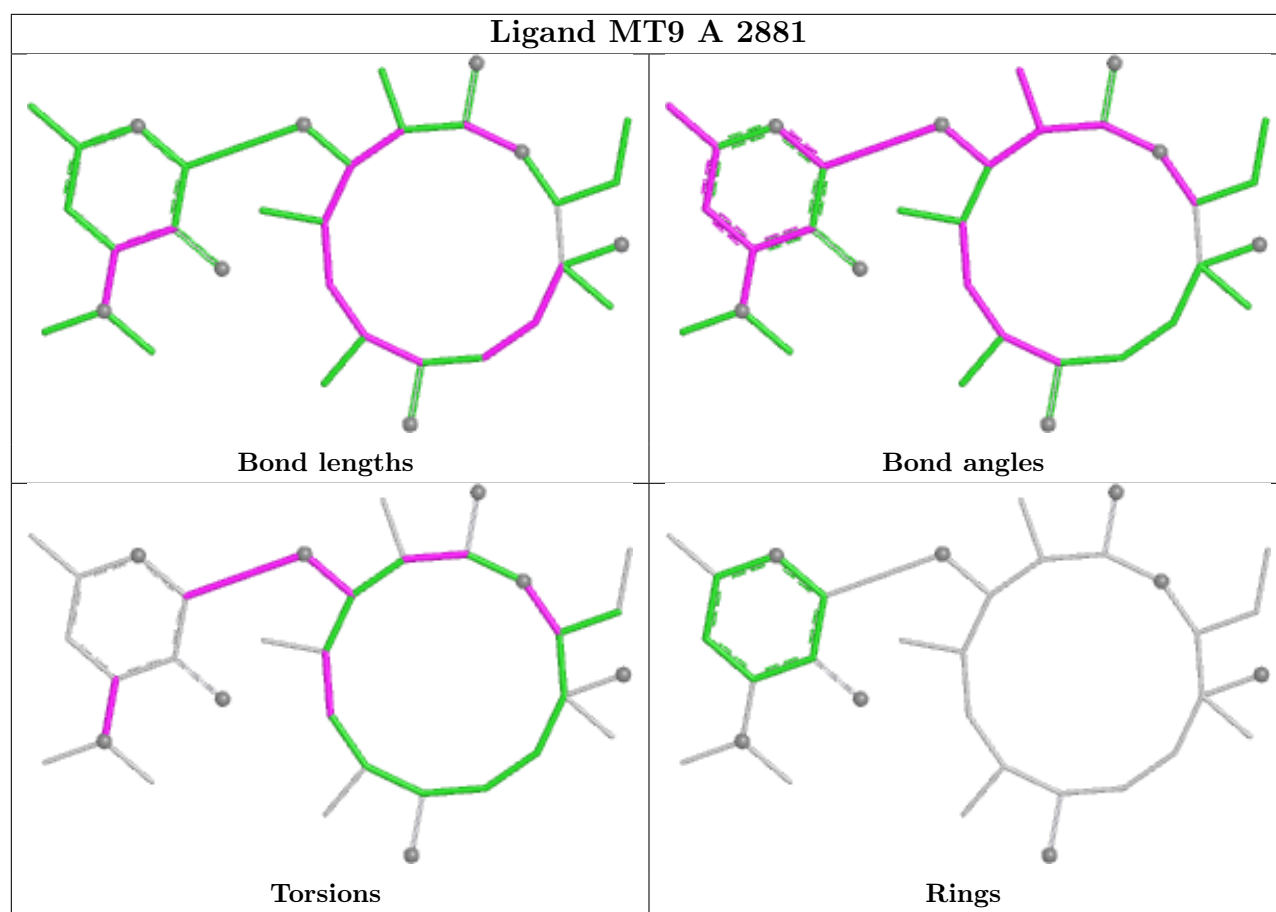
Mol	Chain	Res	Type	Atoms
3	A	2881	MT9	C11-C12-C13-O2
3	A	2881	MT9	C12-C11-O4-C15
3	A	2881	MT9	C10-C11-O4-C15
3	A	2881	MT9	C23-C10-C9-C8

There are no ring outliers.

1 monomer is involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	2881	MT9	5	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

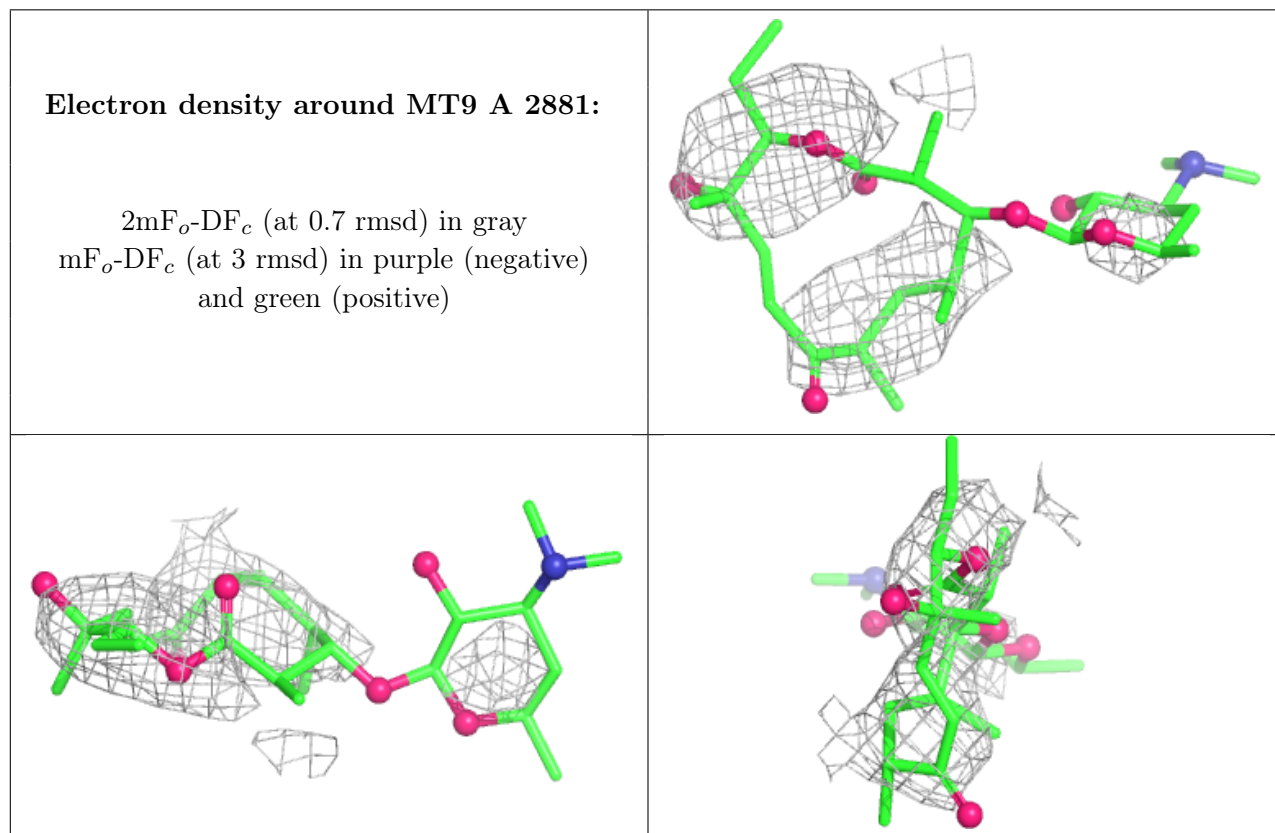
### 6.3 Carbohydrates [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands [i](#)

Unable to reproduce the depositors R factor - this section is therefore empty.

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



## 6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.